

George P. Coleman Memorial Bridge Yorktown / Gloucester Point, VA



This major steel deck truss crossing the York River at Yorktown, VA, includes two 500 ft long swing spans. Lightweight concrete was used for the decks on the truss spans, which were constructed on falsework in Norfolk, VA, then barged as completed units to the site for erection. The lightweight concrete decks were cast in removable forms. Installation of the truss bridge segments was completed in a single nine day closure. Normal weight concrete was used for the decks on the approach spans (Castrodale&Robinson 2008).

While this project was a rehabilitation project, it involved the complete replacement of the superstructure. The main truss spans of this bridge were replaced and widened. Lightweight concrete was used in the bridge deck of the new structure to reduce the weight of the deck, resulting in a reduced quantity of steel required for the trusses. With the reduced superstructure weight, the existing piers could be widened without requiring the driving of additional piles. Lightweight concrete had been used successfully for decks on other bridges in Virginia, so the DOT was open to its use on this major crossing. The same specification was used for the lightweight concrete deck as the standard VDOT normal weight concrete deck, with the exception of a higher concrete compressive strength (4,500 psi instead of 4,000 psi) to account for the reduced shear capacity of the lightweight concrete and a density of 115 pcf (Abrahams 1996).

The lightweight concrete deck on the truss spans was ground as required to achieve the desired roadway profile and rideability, then transversely grooved for skid resistance. This work was completed prior to final erection of the trusses to make possible the rapid opening of the bridge to traffic. The surface of the deck remains exposed to traffic.

During a visit to the bridge in 2005 by one of the authors, no cracks were visible on the top or underside of the lightweight concrete deck. However, the normal weight concrete deck on the approach spans, which was conventionally constructed on site, had suffered from significant transverse cracking at an early age and had been repaired. It was learned from a VDOT inspector familiar with the bridge that the lightweight concrete deck had performed better than the normal weight concrete deck. It should be noted, however, that the conditions for placing the two types of concrete decks were probably different, which may have affected the performance of the decks (Castrodale&Robinson 2008).

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